

1 We claim:

1 1. In a magnetic disk drive having a head disk assembly (HDA) including a base,
2 a rotating disk that carries position information in a plurality of servo wedges that
3 are distributed around the disk, a rotary actuator that pivots relative to the base
4 and carries a transducer that periodically reads the position information from the
5 servo wedges on the rotating disk, a VCM circuit that includes a voice coil motor
6 (VCM) that responds to a control effort signal that is periodically adjusted by a
7 servo control system such that the transducer tends to follow a track that is
8 defined by the position information during a track-following operation, a method
9 of adaptively reducing an effect of vibration during the track following operation
10 comprising the steps of:

11 mounting a sensor within the magnetic disk drive to produce a
12 sensor signal in response to a vibration that tends to cause
13 the rotary actuator to move off-track;
14 reading the position information from a presently active servo
15 wedge;
16 producing a position error signal based on a difference between an
17 indicated position signal and a target position signal;
18 calculating a nominal control effort signal based on the position
19 error signal;

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1 reading the sensor signal to produce a sensor value associated
2 with the presently active servo wedge;
3 modifying the sensor value based on a sensor gain value to
4 produce a control effort adjustment signal;
5 adjusting the nominal control effort signal with the control effort
6 adjustment signal to produce an adjusted control effort
7 signal
8 outputting the adjusted control effort signal to the VCM circuit; and
9 altering the sensor gain value based on the position error signal
10 and the sensor value associated with the presently active
11 servo wedge for use during a next active servo wedge.

1 2. The method of Claim 1 wherein the step of altering the sensor
2 gain value based on the position error signal and the sensor value associated
3 with the presently active servo wedge for use in a next active servo wedge is
4 accomplished by setting an adaptive gain filter.

1 3. The method of Claim 2 wherein the adaptive gain filter has one
2 coefficient.

1 4. The method of Claim 2 wherein the adaptive gain filter has
2 multiple coefficients.

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1 5. The method of Claim 1 wherein the VCM circuit further includes
2 a DAC and wherein the step of outputting the adjusted control effort signal to the
3 VCM circuit comprises the sub steps of:
4 providing the adjusted control effort signal to the DAC; and
5 outputting an analog control effort signal that corresponds to the
6 adjusted control effort signal from the DAC to the VCM.

1 6. The method of Claim 1 wherein the step of modifying the sensor
2 value based on a sensor gain value to produce a control effort adjustment signal
3 is accomplished by multiplying the sensor value by the gain value.

1 7. The method of Claim 1 wherein the step of adjusting the
2 nominal control effort signal with the control effort adjustment signal to produce
3 an adjusted control effort signal is accomplished by adding the control effort
4 adjustment value to the nominal control effort value.

1 8. The method of Claim 1 wherein the vibration is a linear
2 vibration.

1 9. The method of Claim 1 wherein the rotary actuator exhibits an
2 effective imbalance that is affected by the linear vibrations.